	ATTORNEY'S DOCKET NUMBER
TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371	112740-168 ~~Rec'd PCT/PTO~~ 0 9 MAY 2001
	U.S. APPLICATION NO. (IF KNOWN, SEE 37 CFR 09/831440

INTERNATIONAL APPLICATION NO. PCT/DE00/03079	INTERNATIONAL FILING DATE 06 June 2000	PRIORITY DATE CLAIMED 09 September 1999

TITLE OF INVENTION

METHOD FOR IMPLEMENTING A CALL BACK SERVICE IN A MOBILE RADIO NETWORK

APPLICANT(S) FOR DO/EO/US

Andreas Berg et al.

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.

2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.

3. ☒ This is an express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(1).

4. ☒ A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.

5. ☒ A copy of the International Application as filed (35 U.S.C. 371 (c) (2))

    a. ☒ is transmitted herewith (required only if not transmitted by the International Bureau).

    b. ☐ has been transmitted by the International Bureau.

    c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US).

6. ☒ A translation of the International Application into English (35 U.S.C. 371(c)(2)).

7. ☒ A copy of the International Search Report (PCT/ISA/210).

8. ☒ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371 (c)(3))

    a. ☐ are transmitted herewith (required only if not transmitted by the International Bureau).

    b. ☐ have been transmitted by the International Bureau.

    c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.

    d. ☒ have not been made and will not be made.

9. ☐ A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).

10. ☒ An oath or declaration of the inventor(s) (35 U.S.C. 371 (c)(4)).

11. ☐ A copy of the International Preliminary Examination Report (PCT/IPEA/409).

12. ☐ A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371 (c)(5)).

Items 13 to 20 below concern document(s) or information included:

13. ☒ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.

14. ☒ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.

15. ☒ A **FIRST** preliminary amendment.

16. ☐ A **SECOND** or **SUBSEQUENT** preliminary amendment.

17. ☒ A substitute specification.

18. ☐ A change of power of attorney and/or address letter.

19. ☒ Certificate of Mailing by Express Mail

20. ☒ Other items or information:

> **Submission of Drawings Figures 1-3 on two sheets**

21. The following fees are submitted:.

BASIC NATIONAL FEE (37 CFR 1.492 (a) (1) - (5)) :

☐ Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2) paid to USPTO and International Search Report not prepared by the EPO or JPO **$1,000.00**

☒ International preliminary examination fee (37 CFR 1.482) not paid to USPTO but Internation Search Report prepared by the EPO or JPO **$860.00**

☐ International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445(a)(2)) paid to USPTO **$710.00**

☐ International preliminary examination fee paid to USPTO (37 CFR 1.482) but all claims did not satisfy provisions of PCT Article 33(1)-(4) **$690.00**

☐ International preliminary examination fee paid to USPTO (37 CFR 1.482) and all claims satisfied provisions of PCT Article 33(1)-(4) **$100.00**

CALCULATIONS PTO USE ONLY

JC08 Rec'd PCT/PTO **0 9 MAY 2001**

ENTER APPROPRIATE BASIC FEE AMOUNT = | **$860.00** |

Surcharge of **$130.00** for furnishing the oath or declaration later than ☐ 20 ☐ 30 months from the earliest claimed priority date (37 CFR 1.492 (e)). | **$0.00** |

CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE	
Total claims	11 - 20 =	0	x $18.00	$0.00
Independent claims	1 - 3 =	0	x $80.00	$0.00
Multiple Dependent Claims (check if applicable).			☐	$0.00

TOTAL OF ABOVE CALCULATIONS = | $860.00 |

Reduction of 1/2 for filing by small entity, if applicable. Verified Small Entity Statement must also be filed (Note 37 CFR 1.9, 1.27, 1.28) **(check if applicable).** ☐ | **$0.00** |

SUBTOTAL = | $860.00 |

Processing fee of **$130.00** for furnishing the English translation later than ☐ 20 ☐ 30 months from the earliest claimed priority date (37 CFR 1.492 (f)). + | **$0.00** |

TOTAL NATIONAL FEE = | $860.00 |

Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31) **(check if applicable).** ☐ | **$0.00** |

TOTAL FEES ENCLOSED = | $860.00 |

	Amount to be: refunded	$
	charged	$

☒ A check in the amount of **$860.00** to cover the above fees is enclosed.

☐ Please charge my Deposit Account No. in the amount of to cover the above fees.
A duplicate copy of this sheet is enclosed.

☒ The Commissioner is hereby authorized to charge any fees which may be required, or credit any overpayment to Deposit Account No. **02-1818** A duplicate copy of this sheet is enclosed.

NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO:

William E. Vaughan
Bell, Boyd & Lloyd LLC
P.O. Box 1135
Chicago, IL 60690-1135

SIGNATURE

William E. Vaughan
NAME

39,056
REGISTRATION NUMBER

May 9, 2001
DATE

BOX PCT

IN THE UNITED STATES ELECTED/DESIGNATED OFFICE

OF THE UNITED STATES PATENT AND TRADEMARK OFFICE

UNDER THE PATENT COOPERATION TREATY-CHAPTER I

PRELIMINARY AMENDMENT

APPLICANTS:	Andreas Berg et al.	DOCKET NO: 112740-168
SERIAL NO:		GROUP ART UNIT:
		EXAMINER:
INTERNATIONAL APPLICATION NO:		PCT/DE00/03079
INTERNATIONAL FILING DATE:		06 June 2000
INVENTION:	METHOD FOR IMPLEMENTING A CALL BACK SERVICE IN A MOBILE RADIO NETWORK	

Assistant Commissioner for Patents,
Washington, D.C. 20231

Sir:

Please amend the above-identified International Application before entry into the National stage before the U.S. Patent and Trademark Office under 35 U.S.C. §371 as follows:

In the Specification:

Please replace the Specification of the present application, including the Abstract, with the following Substitute Specification:

SPECIFICATION

TITLE

METHOD FOR IMPLEMENTING A CALL BACK SERVICE IN A MOBILE RADIO NETWORK

BACKGROUND OF THE INVENTION

Field of the Invention

Systems for mobile communication have increasingly gained in importance in recent years. Their spread is aided by the introduction of standards such as GSM (Global System for Mobile Communication) and, in the meantime, it has also become possible to communicate outside the borders of one's own country and network operator.

If a telephone call originates in a foreign country, the network operator of the visited public land mobile network (VPLMN) currently usually earns 70% of the fees paid by the network subscriber whereas the operator of the home public land mobile network (HPLMN) only receives 30%.

Description of the Prior Art

The customer of telecommunication networks, mobile radio networks, is already being offered a multiplicity of telecommunication services. To be able to offer new services rapidly and independently of manufacture and network operator, if possible, including the existing infrastructure, the concept of the Intelligent Network has been developed. A standardized concept which defines the IN architecture has been worked out in the ITU (see Standards Q.1200 ff).

In a further development, CAMEL (Customized Application for Mobile Network Enhanced Logic, see also GSM 02.78) was developed in which IN features were introduced into the GSM architecture. CAMEL simplifies roaming both internationally and between networks of different operators and creates a uniform protocol for accessing CAMEL servers in other GSM networks.

It is an object of the present invention, therefore, to specify a solution to the abovementioned problem in international or inter-provider roaming.

It is another object of the present invention to implement a call back service in a mobile radio network.

SUMMARY OF THE INVENTION

Accordingly, the call back service for roaming mobile radio subscribers of the present invention allows PLMN operators to use the advantages of a call back service.

The call back service UCB (USSD (unstructured supplementary service data) Call Back Service) provides the desired functions:

- Analysis of an incoming USSD string,
- Analysis of A party and B party,
- Call set-up to the A party,
- Call set-up to the B party.

The IN service UCB is triggered via a USSD string from the visited network VPLMN. If the roaming subscriber is not an IN (intelligent network)

2

customer, the HLR (home location register) forwards the USSD string to a standard SCP which supports UCB. If he is an IN customer, the correct service control point SCP address is located in the CAMEL Subscriber Information CSI.

Using a call back service, the ratio of fees can be reversed in favor of the HPLMN operator of the home network. Since the call is set up by the HPLMN, the HPLMN operator now receives the greater proportion of the fees.

The interworking of the novel USSD Call back Service UCB with other IN services also will be described. The special feature is that UCB enables roaming subscribers to telephone via IN even if the visited network (VPLMN) does not support the CAMEL protocol.

The UCB service is, thus, available to roaming IN customers who can use their subscribed service even without CAMEL. That is, roaming subscribers use CAMEL in VPLMNs which support CAMEL, and in countries without CAMEL support, the USSD solution is used.

Furthermore, non-IN customers also can use UCB.

Another problem is interworking between a number of IN services in an SCP. This problem is solved by the IN service UCB cleverly setting the Called Party Address (CdPA) and Calling Party Address (CgPA).

Additional features and advantages of the present invention are described in, and will be apparent from, the following Detailed Description of the Preferred Embodiments and the Drawings.

DESCRIPTION OF THE DRAWINGS

Figure 1 shows the activation of the UCB service in the SCP;

Figure 2 shows how the call back connection according to the present invention is set up; and

Figure 3 shows the interworking with a telecommunication network which does not support CAMEL.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Figure 1 shows how the call back service UCB is triggered by an incoming USSD (Unstructured Supplementary Service Data) string which is transmitted by the roaming mobile radio subscriber via the mobile switching center MSC in the visited network VPLMN, A.

3

A USSD string is normally intended for the home location register HLR in which the subscriber is administered. Here, however, the "follow-me" (SR7) function available in Siemens HLRs is triggered via the USSD string header. On the one hand, it expands the USSD string by the MSISDN (Mobile Subscriber ISDN Number) of the subscriber (A party) and then forwards it to a service control point SCP which supports the call back service UCB (B).

The SCP starts the IN service UCB. This service, in turn, returns to the A party a USSD string which acknowledges the receipt, C, D.

The IN service UCB first sets up a connection to the A party via "Initiate Call Attempt" ICA, see Figure 2. Calling party CgPA is now the Called Party CdPA (B party) actually dialed and CdPA is the original CgPA (MSISDN of the A party). At the same time, all Event Detection Points EDP are armed with RequestReportBCSMEvent RRB, 21, and then the procedure continues with "Continue" CUE.

According to the GSM standard, a gateway mobile switching center GMSC interrogates the home location register HLR of the subscriber with SendRoutingInformation SRI, 22, 23. The connection to the roaming party is set up via an IAM, 24. The service UBC receives via EventReportBCSM ERB the information whether the A party has answered (answer), is busy, is not answering (no_answer) or not available (not_reachable), 25.

In the case of the "answer", UCB responds with FurnishChargingInformation FCI so that an IN charges (AMA) ticket is written in the GMSC, and the operation "connect" CON which establishes the connection with the B party originally requested, 26.

In all other events (busy, no_answer, not_reachable), the IN dialog is ended in an ordered manner with "ReleaseCall" RL. Apart from "answer", it is not absolutely necessary to set the flags of the EDPs. If, for example, the "not_reachable" flag is not set, the SCP does not find out about this event. The GMSC releases the call by itself and the SCP responds in the same way if it does not receive any information within a certain time.

Charging is ensured by the scenario. Using "answer" by A, the GMSC generates a "roaming ticket" in which the answer time is entered. In the VMSC of

4

the A party, an "MTC (mobile terminated cell) Ticket" is written and the SSP writes an "IN AMA (automatic message accounting) Ticket" due to the FCI (furnish charging information) operation.

Using "GetUserRecord", UCB decides whether and which IN service has been subscribed to by the A party. If the A party has no IN subscription, UCB acts as described above.

If the A party has an IN subscription, UCB expands the CgPA in the InitiateCallAttempt ICA by an administerable number of administerable numbers XXX which also can contain hexadecimal digits (in Figure 3, the subscribed IN service prepaid service is shown by way of example), 1. The subsequent interrogation of the HLR, 2 and 3, possibly supplies a T-CSI.

Since the MTC IN dialog is not wanted - the roaming A party actually wants to transmit a mobile originated call (MOC) - it must either be suppressed via SDDPFC or in the EntryFSL (flexible service logic) or MTC (Mobile Terminated Call) service logic on the basis of the XXX code in the CgPA, 4 and 5. The second interrogation of the home location register HLR (second step in the two-stage interrogation!) supplies the MSRN (mobile station roaming number) , 6 and 7, which provides for the connection to the A party, 8.

As soon as the A party answers, 9, the UCB is informed of this via ERB, 10. UCB then continues with the "Connect" operation CON which, as calling party CgPA, contains the MSISDN of the A party and, as called party CdPA, the number of the B party originally dialed, expanded by an administerable number of administerable numbers YYY (hexadecimal digits are possible), 11. Following YYY, a code point is to be set up at SSP which triggers the desired IN service at the "correct" SCP via an IDP (Initial Detection Point) (YYY must therefore be set up IN service-specifically).

Since the SCP has no information whatever about the A location of the A party, the service logic EntryFSL or the MOC IN service logic must determine the A location via the "AnyTimeInterrogation" ATI, 13. After that, the MOC service logic runs as if it had been started directly via a CAP (camel application part) :IDP. In the case shown, PPS (prepaid service) continues with "ApplyCharging" AC and "Connect" CON B party.

If the A party is not available (busy, no_answer, not_reachable), the procedure described above optionally can be adopted.

Although the present invention has been described with reference to specific embodiments, those of skill in the art will recognize that changes may be made thereto without departing from the spirit and scope of the invention as set forth in the hereafter appended claims.

ABSTRACT OF THE DISCLOSURE

A USSD Call Back Service UCB which provides a function via which a telephone call MOC begun in a foreign country is implemented by a call back service which then provides the functions of:

- Analysis of an incoming USSD string,
- Analysis of A party and B party,
- Call set-up to the A party,
- Call set-up to the B party.

In the claims:

On page 8, cancel line 1, and substitute the following left-hand justified heading therefor:

We Claim as Our Invention:

Please cancel claims 1-11, without prejudice, and substitute the following claims therefor:

12.   A method for implementing a call back service in a mobile radio network, the method comprising the steps of:

transmitting a service call from a calling party, via a first mobile switching center in a first subnetwork, to a home location register;

forwarding the service call by the home location register to a service control point;

analyzing the service call by the service control point, including information relating to the calling party and a called party;

initiating a first call set-up to the calling party; and

initiating a second call set-up to the called party.

13. A method for implementing a call back service in a mobile radio network as claimed in claim 12, wherein both the first and second call set-up are initiated by a second mobile switching center in a second subnetwork.

14. A method for implementing a call back service in a mobile radio network as claimed in claim 13, the method further comprising the step of:

sending, via the service control point, a connection set-up request to the second switching center.

15. A method for implementing a call back service in a mobile radio network as claimed in claim 12, the method further comprising the step of:

starting a function in the home location register by a header in the service call.

16. A method for implementing a call back service in a mobile radio network as claimed in claim 15, wherein the service call is supplemented by a call number of the calling party by the home location register before being forwarded to the service control point.

17. A method for implementing a call back service in a mobile radio network as claimed in claim 12, the method further comprising the step of:

acknowledging receipt of the service call to the calling party by the service control point.

18. A method for implementing a call back service in a mobile radio network as claimed in claim 12, the method further comprising the step of:

generating charging information via the second switching center upon successful call set-up.

19. A method for implementing a call back service in a mobile radio network as claimed in claim 12, the method further comprising the step of:

ending the service call, which is an intelligent service call, in an ordered manner by the respective service upon an unsuccessful call set-up.

20. A method for implementing a call back service in a mobile radio network as claimed in claim 12, the method further comprising the steps of:

subscribing, by the subscriber, to a further intelligent network service;

sending, via the service control point, a connection set-up request to the second switching center; and

supplementing the connection set-up request by an identity of the further intelligent network service.

21. A method for implementing a call back service in a mobile radio network as claimed in claim 12, the method further comprising the step of:

suppressing, at the service control point, intelligent network dialogues produced with respect to the call originally received as a mobile terminated call.

22. A method for implementing a call back service in a mobile radio network as claimed in claim 20, the method further comprising the steps of:

requesting a connection set-up to the called party after the successful connection set-up to the calling party; and

supplementing a number originally dialed by an identity of the service control point responsible for the further intelligent network service.
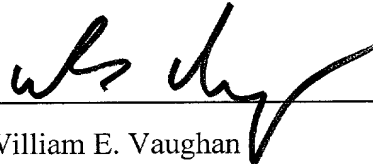
REMARKS

The present amendment makes editorial changes and corrects typographical errors in the specification, which includes the Abstract, in order to conform the specification to the requirements of United States Patent Practice. No new matter is added thereby. Attached hereto is a marked-up version of the changes made to the specification by the present amendment. The attached page is captioned **"Version With Markings To Show Changes Made".**

In addition, the present amendment cancels original claims 1-11 in favor of new claims 12-22. Claims 12-22 have been presented solely because the revisions by red-lining and underlining which would have been necessary in claims 1-11 in

8

order to present those claims in accordance with preferred United States Patent Practice would have been too extensive, and thus would have been too burdensome. The present amendment is intended for clarification purposes only and not for substantial reasons related to patentability pursuant to 35 USC §§103, 102, 103 or 112. Indeed, the cancellation of claims 1-11 does not constitute an intent on the part of the Applicants to surrender any of the subject matter of claims 1-11.

Early consideration on the merits is respectfully requested.

Respectfully submitted,

_____ (Reg. No. 39,056)
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Chicago, Illinois 60690-1135
(312) 807-4292
Attorneys for Applicants

VERSIONS WITH MARKINGS TO SHOW CHANGES MADE

In The Specification:

The Specification of the present application, including the Abstract, has been amended as follows:

S P E C I F I C A T I O N

TITLE

~~Method for implementing a call back service in a mobile radio network~~

METHOD FOR IMPLEMENTING A CALL BACK SERVICE IN A MOBILE RADIO NETWORK

BACKGROUND OF THE INVENTION

Field of the Invention

~~Technical field of the invention~~

Systems for mobile communication have increasingly gained in importance in recent years. Their spread is aided by the introduction of standards such as GSM (Global System for Mobile Communication) and, in the meantime, it has also become possible to communicate outside the borders of one's own country and network operator.

If a telephone call originates in a foreign country, the network operator of the visited public land mobile network (VPLMN) currently usually earns 70% of the fees paid by the network subscriber whereas the operator of the home public land mobile network (HPLMN) only receives 30%.

~~Prior Art~~

Description of the Prior Art

The customer of telecommunication networks, ~~and especially the~~ particularly mobile radio networks, is already being offered a multiplicity of telecommunication services. To be able to offer new services rapidly and independently of manufacture and network operator, if possible, including the existing infrastructure, the concept of the Intelligent Network has been developed. A standardized concept which defines the IN architecture has been worked out in the ITU (see Standards Q.1200 ff).

10

In a further development, CAMEL (Customized Application for Mobile Network Enhanced Logic, see also GSM 02.78) was developed in which IN features were introduced into the GSM architecture. CAMEL simplifies roaming both internationally and between networks of different operators and creates a uniform protocol for accessing CAMEL servers in other GSM networks.

It is an object of the present invention, therefore, to specify a solution to the abovementioned problem in international or inter-provider roaming.

It is another object of the present invention to implement a call back service in a mobile radio network.

~~Description of the invention~~

SUMMARY OF THE INVENTION

~~This object is achieved by a method according to Claim 1.~~

~~The~~ Accordingly, the call back service for roaming mobile radio subscribers ~~according to~~ of the present invention allows PLMN operators to use the advantages of a call back service.

The call back service UCB (USSD (unstructured supplementary service data) Call Back Service) provides the desired functions:

- Analysis of an incoming USSD string,
- Analysis of A party and B party,
- Call set-up to the A party,
- Call set-up to the B party.

The IN service UCB is triggered ~~by means of~~ via a USSD string from the visited network VPLMN. If the roaming subscriber is not an IN (intelligent network) customer, the HLR (home location register) forwards the USSD string to a standard SCP which supports UCB;. ~~if~~ If he is an IN customer, the correct service control point SCP address is located in the CAMEL Subscriber Information CSI.

Using a call back service, the ratio of fees can be reversed in favor of the HPLMN operator of the home network;. ~~since~~ Since the call is set up by the HPLMN, the HPLMN operator now receives the greater proportion of the fees.

11

Advantageous embodiments and further developments are specified in the subclaims.

The interworking of the novel USSD Call back Service UCB with other IN services ~~will~~ also will be described. The special feature is that UCB enables roaming subscribers to telephone via IN even if the visited network (VPLMN) does not support the CAMEL protocol.

The UCB service is, thus, available to roaming IN customers who can use their subscribed service even without CAMEL. ~~I.e.~~ That is, roaming subscribers use CAMEL in VPLMNs which support CAMEL, and in countries without CAMEL support, the USSD solution is used.

Furthermore, non-IN customers ~~can~~ also can use UCB.

Another problem is interworking between a number of IN services in an SCP. This problem is solved by the IN service UCB cleverly setting the Called Party Address (CdPA) and Calling Party Address (CgPA).

Additional features and advantages of the present invention are described in, and will be apparent from, the following Detailed Description of the Preferred Embodiments and the Drawings.

~~Brief description of the drawings~~

DESCRIPTION OF THE DRAWINGS

~~In the text which follows, the invention will be explained with reference to exemplary embodiments, in which:~~

Figure 1 shows the activation of the UCB service in the SCP.;

Figure 2 shows how the call back connection according to the present invention is set up.; and

Figure 3 shows the interworking with a telecommunication network which does not support CAMEL.

~~Description of the preferred embodiments~~

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Figure 1 shows how the call back service UCB is triggered by an incoming USSD (Unstructured Supplementary Service Data) string which is transmitted by

12

the roaming mobile radio subscriber via the mobile switching center MSC in the visited network VPLMN, A.

A USSD string is normally intended for the home location register HLR in which the subscriber is administered. Here, however, the "follow-me" (SR7) function available in Siemens HLRs is triggered ~~by means of~~ via the USSD string header. On the one hand, it expands the USSD string by the MSISDN (Mobile Subscriber ISDN Number) of the subscriber (A party) and then forwards it to a service control point SCP which supports the call back service UCB (B).

The SCP starts the IN service UCB. This service, in turn, returns to the A party a USSD string which acknowledges the receipt, C, D.

The IN service UCB first sets up a connection to the A party ~~by means of~~ via "Initiate Call Attempt" ICA, see Figure 2. Calling party CgPA is now the Called Party CdPA (B party) actually dialed and CdPA is the original CgPA (MSISDN of the A party)~~;~~ ~~at~~ At the same time, all Event Detection Points EDP are armed with RequestReportBCSMEvent RRB, 21, and then the procedure continues with "Continue" CUE.

According to the GSM standard, a gateway mobile switching center GMSC interrogates the home location register HLR of the subscriber with SendRoutingInformation SRI, 22, 23. The connection to the roaming party is set up via an IAM, 24. The service UBC receives via EventReportBCSM ERB the information whether the A party has answered (answer), is busy, is not answering (no_answer) or not available (not_reachable), 25.

In the case of the "answer", UCB responds with FurnishChargingInformation FCI so that an IN charges (AMA) ticket is written in the GMSC, and the operation "connect" CON which establishes the connection with the B party originally requested, 26.

In all other events (busy, no_answer, not_reachable), the IN dialog is ended in an ordered manner with "ReleaseCall" RL. Apart from "answer", it is not absolutely necessary to set the flags of the EDPs~~:~~ ~~if~~ If, for example, the "not_reachable" flag is not set, the SCP does not find out about this event. The GMSC releases the call by itself and the SCP responds in the same way if it does not receive any information within a certain time.

Charging is ensured by the scenario: using Using "answer" by A, the GMSC generates a "roaming ticket" in which the answer time is entered. In the VMSC of the A party, an "MTC (mobile terminated cell) Ticket" is written and the SSP writes an "IN AMA (automatic message accounting) Ticket" due to the FCI (furnish charging information) operation.

Using "GetUserRecord", UCB decides whether and which IN service has been subscribed to by the A party. If the A party has no IN subscription, UCB acts as described above.

If the A party has an IN subscription, UCB expands the CgPA in the InitiateCallAttempt ICA by an administerable number of administerable numbers XXX which can also can contain hexadecimal digits (in Figure 3, the subscribed IN service prepaid service is shown by way of example), 1. The subsequent interrogation of the HLR, 2 and 3, possibly supplies a T-CSI.

Since the MTC IN dialog is not wanted - the roaming A party actually wants to transmit a mobile originated call (MOC) - it must either be suppressed by means of via SDDPFC or in the EntryFSL (flexible service logic) or MTC (Mobile Terminated Call) service logic on the basis of the XXX code in the CgPA, 4 and 5. The second interrogation of the home location register HLR (second step in the two-stage interrogation!) supplies the MSRN (mobile station roaming number) , 6 and 7, which provides for the connection to the A party, 8.

As soon as the A party answers, 9, the UCB is informed of this via ERB, 10. UCB then continues with the "Connect" operation CON which, as calling party CgPA, contains the MSISDN of the A party and, as called party CdPA, the number of the B party originally dialed, expanded by an administerable number of administerable numbers YYY (hexadecimal digits are possible), 11. Following YYY, a code point is to be set up at SSP which triggers the desired IN service at the "correct" SCP via an IDP (Initial Detection Point) (YYY must therefore be set up IN service-specifically).

Since the SCP has no information whatever about the A location of the A party, the service logic EntryFSL or the MOC IN service logic must determine the A location via the "AnyTimeInterrogation" ATI, 13. After that, the MOC service logic runs as if it had been started directly via a CAP (camel application part) :IDP.

14

In the case shown, PPS (prepaid service) continues with "ApplyCharging" AC and "Connect" CON B party.

If the A party is not available (busy, no_answer, not_reachable), the procedure described above ~~can~~ optionally can be adopted.

Although the present invention has been described with reference to specific embodiments, those of skill in the art will recognize that changes may be made thereto without departing from the spirit and scope of the invention as set forth in the hereafter appended claims.

List of abbreviations

AMA	Automatic Message Accounting
CAMEL	Customized Applications For Mobile Network Enhanced Logic (GSM 02.78)
CAP	CAMEL Application Part
CdPA	Called Party
CgPA	Calling Party
CON	Connect
CSI	CAMEL Subscriber Information
CUE	Continue
EDP	Event Detection Point
FCI	Furnish Charging Information
FSL	Flexible Service Logic
GMSC	Gateway Mobile Services Switching Center
GSM	Global System for Mobile Communication
HLR	Home Location Register
HPLMN	Home Public Land Mobile Network
ICA	InitiateCallAttempt
IN	Intelligent Network
MOC	Mobile Originated Call
MSC	Mobile Switching Center
MSISDN	Mobile Subscriber ISDN Number
MSRN	Mobile Station Roaming Number
MTC	Mobile Terminated Call
PPS	Prepaid Service
SCP	Service Control Point
SRI	Send Routing Information
VPLMN	Visited Public Land Mobile Network
UCB	USSD Call Back Service
USSD	Unstructured Supplementary Service Data

~~Abstract~~

ABSTRACT OF THE DISCLOSURE

~~Method for implementing a call-back service in a mobile radio network~~

~~The~~ A USSD Call Back Service UCB ~~according to the invention~~ which provides a function ~~by means of~~ via which a telephone call MOC begun in a foreign country is implemented by a call back service which then provides the functions of:

- Analysis of an incoming USSD string,
- Analysis of A party and B party,
- Call set-up to the A party,
- Call set-up to the B party.

~~Figure 2~~

~~Figure 3~~

~~mit = with~~

17

Description

Method for implementing a call back service in a mobile radio network

5

Technical field of the invention

Systems for mobile communication have increasingly gained in importance in recent years. Their spread is
10 aided by the introduction of standards such as GSM (Global System for Mobile Communication) and in the meantime, it has also become possible to communicate outside the borders of one's own country and network operator.

15

If a telephone call originates in a foreign country, the network operator of the visited network (VPLMN) currently usually earns 70% of the fees paid by the network subscriber whereas the operator of the home
20 network (HPLMN) only receives 30%.

Prior Art

The customer of telecommunication networks and
25 especially the mobile radio networks is already being offered a multiplicity of telecommunication services. To be able to offer new services rapidly and independently of manufacture and network operator if possible, including the existing infrastructure, the
30 concept of the Intelligent Network has been developed. A standardized concept which defines the IN architecture has been worked out in the ITU (see Standards Q.1200 ff).

35 In a further development, CAMEL (Customized Application for Mobile Network Enhanced Logic, see also GSM 02.78) was developed in which IN features were introduced into the GSM architecture. CAMEL simplifies roaming

both internationally and between networks of different operators and creates a uniform protocol for accessing CAMEL servers in other GSM networks.

5   It is an object of the invention to specify a solution to the abovementioned problem in international or inter-provider roaming.

It is another object of the invention to implement a
10   call back service in a mobile radio network.

Description of the invention

This object is achieved by a method according to Claim
15   1.

The call back service for roaming mobile radio subscribers according to the invention allows PLMN operators to use the advantages of a call back service.
20
The call back service UCB (USSD Call Back Service) provides the desired functions:

*   Analysis of an incoming USSD string,
25   *   Analysis of A party and B party,
*   Call set-up to the A party,
*   Call set-up to the B party.

The IN service UCB is triggered by means of a USSD
30   string from the visited network VPLMN. If the roaming subscriber is not an IN customer, the HLR forwards the USSD string to a standard SCP which supports UCB; if he is an IN customer, the correct SCP address is located in the CAMEL Subscriber Information CSI.

Using a call back service, the ratio of fees can be reversed in favor of the HPLMN operator of the home network: since the call is set up by the HPLMN, the HPLMN operator now receives the greater proportion of

5 the fees.

Advantageous embodiments and further developments are specified in the subclaims.

10 The interworking of the novel USSD Call back Service UCB with other IN services will also be described. The special feature is that UCB enables roaming subscribers to telephone via IN even if the visited network (VPLMN) does not support the CAMEL protocol.

15

The UCB service is thus available to roaming IN customers who can use their subscribed service even without CAMEL. I.e., roaming subscribers use CAMEL in VPLMNs which support CAMEL, and in countries without

20 CAMEL support, the USSD solution is used.

Furthermore, non-IN customers can also use UCB.

Another problem is interworking between a number of IN

25 services in an SCP. This problem is solved by the IN service UCB cleverly setting the Called Party Address (CdPA) and Calling Party Address (CgPA).

Brief description of the drawings

30

In the text which follows, the invention will be explained with reference to exemplary embodiments, in which:

35 Figure 1 shows the activation of the UCB service in the SCP,
Figure 2 shows how the call back connection according to the invention is set up, and

Figure 3 shows the interworking with a telecommunication network which does not support CAMEL.

Description of the preferred embodiments

5

Figure 1 shows how the call back service UCB is triggered by an incoming USSD (Unstructured Supplementary Service Data) string which is transmitted by the roaming mobile radio subscriber via the mobile
10 switching center MSC in the visited network VPLMN, A.

A USSD string is normally intended for the home location register HLR in which the subscriber is administered. Here, however, the "follow-me" (SR7)
15 function available in Siemens HLRs is triggered by means of the USSD string header. On the one hand, it expands the USSD string by the MSISDN (Mobile Subscriber ISDN Number) of the subscriber (A party) and then forwards it to a service control point SCP which
20 supports the call back service UCB (B).

The SCP starts the IN service UCB. This service, in turn, returns to the A party a USSD string which acknowledges the receipt, C, D.
25

The IN service UCB first sets up a connection to the A party by means of "Initiate Call Attempt" ICA, see Figure 2. Calling party CgPA is now the Called Party CdPA (B party) actually dialled and CdPA is the
30 original CgPA (MSISDN of the A party); at the same time, all Event Detection Points EDP are armed with RequestReportBCSMEvent RRB, 21, and then the procedure continues with "Continue" CUE.

35 According to the GSM standard, a gateway mobile switching center GMSC interrogates the home location register HLR of the subscriber with SendRoutingInformation SRI, 22, 23. The connection to

the roaming party is set up via an IAM, 24. The service
UBC receives via EventReportBCSM ERB the information

whether the A party has answered (answer), is busy, is not answering (no_answer) or not available (not_reachable), 25.

5   In the case of the "answer", UCB responds with FurnishChargingInformation FCI so that an IN charges (AMA) ticket is written in the GMSC, and the operation "connect" CON which establishes the connection with the B party originally requested, 26.

10

In all other events (busy, no_answer, not_reachable), the IN dialog is ended in an ordered manner with "ReleaseCall" RL. Apart from "answer", it is not absolutely necessary to set the flags of the EDPs: if,

15   for example, the "not_reachable" flag is not set, the SCP does not find out about this event. The GMSC releases the call by itself and the SCP responds in the same way if it does not receive any information within a certain time.

20

Charging is ensured by the scenario: using "answer" by A, the GMSC generates a "roaming ticket" in which the answer time is entered. In the VMSC of the A party, an "MTC Ticket" is written and the SSP writes an "IN AMA

25   Ticket" due to the FCI operation.

Using "GetUserRecord", UCB decides whether and which IN service has been subscribed to by the A party. If the A party has no IN subscription, UCB acts as described

30   above.

If the A party has an IN subscription, UCB expands the CgPA in the InitiateCallAttempt ICA by an administerable number of administerable numbers XXX

35   which can also contain hexadecimal digits (in Figure 3, the subscribed IN service prepaid service is shown by way of example), 1. The subsequent interrogation of the HLR, 2 and 3, possibly supplies a T-CSI.

Since the MTC IN dialog is not wanted - the roaming A party actually wants to transmit a mobile originated call (MOC) - it must either be suppressed

by means of SDDPFC or in the EntryFSL or MTC (Mobile Terminated Call) service logic on the basis of the XXX code in the CgPA, 4 and 5. The second interrogation of the home location register HLR (second step in the two-
5   stage interrogation!) supplies the MSRN, 6 and 7, which provides for the connection to the A party, 8.

As soon as the A party answers, 9, the UCB is informed of this via ERB, 10. UCB then continues with the
10 "Connect" operation CON which, as calling party CgPA, contains the MSISDN of the A party and, as called party CdPA, the number of the B party originally dialled, expanded by an administerable number of administerable numbers YYY (hexadecimal digits are possible), 11.
15 Following YYY, a code point is to be set up at SSP which triggers the desired IN service at the "correct" SCP via an IDP (Initial Detection Point) (YYY must therefore be set up IN service-specifically).

20 Since the SCP has no information whatever about the A location of the A party, the service logic EntryFSL or the MOC IN service logic must determine the A location via the "AnyTimeInterrogation" ATI, 13. After that, the MOC service logic runs as if it had been started
25 directly via a CAP:IDP. In the case shown, PPS continues with "ApplyCharging" AC and "Connect" CON B party.

If the A party is not available (busy, no_answer,
30 not_reachable), the procedure described above can optionally be adopted.

List of abbreviations

AMA	Automatic Message Accounting
CAMEL	Customized Applications For Mobile Network Enhanced Logic (GSM 02.78)
CAP	CAMEL Application Part
CdPA	Called Party
CgPA	Calling Party
CON	Connect
CSI	CAMEL Subscriber Information
CUE	Continue
EDP	Event Detection Point
FCI	Furnish Charging Information
FSL	Flexible Service Logic
GMSC	Gateway Mobile Services Switching Center
GSM	Global System for Mobile Communication
HLR	Home Location Register
HPLMN	Home Public Land Mobile Network
ICA	InitiateCallAttempt
IN	Intelligent Network
MOC	Mobile Originated Call
MSC	Mobile Switching Center
MSISDN	Mobile Subscriber ISDN Number
MSRN	Mobile Station Roaming Number
MTC	Mobile Terminated Call
PPS	Prepaid Service
SCP	Service Control Point
SRI	Send Routing Information
VPLMN	Visited Public Land Mobile Network
UCB	USSD Call Back Service
USSD	Unstructured Supplementary Service Data

Patent Claims

1. A method for implementing a call back service in a mobile radio network containing

- a service control point (SCP),
- a first mobile switching center (MSC) in a first subnetwork (VPLMN),
- a second mobile switching center (GMSC) in a second subnetwork (HPLMN)
- a home location register (HLR)

in which a service call (A) is transmitted from a caller (A party) via the first mobile switching center (MSC) from the first subnetwork (VPLMN) to the home location register (HLR) and

is forwarded by the latter to the service control point (SCP), and

the service call is analyzed by the service control point, especially the information relating to caller (A party) and called party (B party), and

a first call set-up is then initiated to the caller (24, 8) and

a second call set-up is initiated to the called party.

2. The method as claimed in claim 1, characterized in that the first and the second call set-up are initiated by the second switching centre (GMSC).

3. The method as claimed in claim 2, characterized in that the service control point sends a connection set-up request (ICA) to the second switching center (GMSC).

4. The method as claimed in one of the preceding claims, characterized in that

a function in the home location register (HLR) is started by the header in the service call.

5. The method as claimed in claim 4, characterized in that the service call (USSD string) is supplemented by the call number (MSISDN) of the calling party by the HLR before it is forwarded to the service control point.

6. The method as claimed in one of the preceding claims, characterized in that the receipt of the service call is acknowledged to the A party (MSC) by the service control point (SCP) (C, D).

7. The method as claimed in one of the preceding claims, characterized in that in the case of a successful call set-up ("answer", 15), the second switching center GMSC generates charging information (AMA Ticket).

8. The method as claimed in one of claims 1 to 5, characterized in that in the case of an unsuccessful call set-up attempt (no_answer, 15), the IN service call is ended in an ordered manner by the service (UCB) (ReleaseCall).

9. The method as claimed in one of the preceding claims, characterized in that the subscriber has subscribed to a further IN service (PPS) and the service control point sends a connection set-up request (ICA) to the second switching center (GMSC), this connection set-up request being supplemented by an identity of the subscribed service (XXX).

10. The method as claimed in one of the preceding claims, characterized in that

IN dialogues produced with respect to the call originally received MTC are suppressed at the service control point (SCP).

5   11. The method as claimed in one of claims 9 or 10, characterized in that after the successful connection set-up ("answer", 9) to the calling party, a connection set-up to the called party is requested, the number originally dialled being

10   supplemented by an identity of the service control point (SCP) responsible for the further IN service (PPS) (YYY).

Abstract

Method for implementing a call back service in a mobile
radio network

5

The USSD Call Back Service UCB according to the
invention provides a function by means of which a
telephone call MOC begun in a foreign country is
implemented by a call back service:

10 • Analysis of an incoming USSD string,
• Analysis of A party and B party,
• Call set-up to the A party,
• Call set-up to the B party.

15 Figure 2

Figure 3

mit = with

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UNDER THE PATENT COOPERATION TREATY-CHAPTER I

5

APPLICANTS: Andreas Berg et al.   DOCKET NO: 112740-168

SERIAL NO: GROUP ART UNIT:

                                        EXAMINER:

10   INTERNATIONAL APPLICATION NO: PCT/DE00/03079

INTERNATIONAL FILING DATE: 06 June 2000

INVENTION: METHOD FOR IMPLEMENTING A CALL BACK SERVICE
               IN A MOBILE RADIO NETWORK

15   Assistant Commissioner for Patents,
     Washington, D.C. 20231

SUBMISSION OF DRAWINGS

20   Applicants herewith submit two sheets (Figs. 1-3) of drawings for the

above-referenced PCT application.

               Respectfully submitted,

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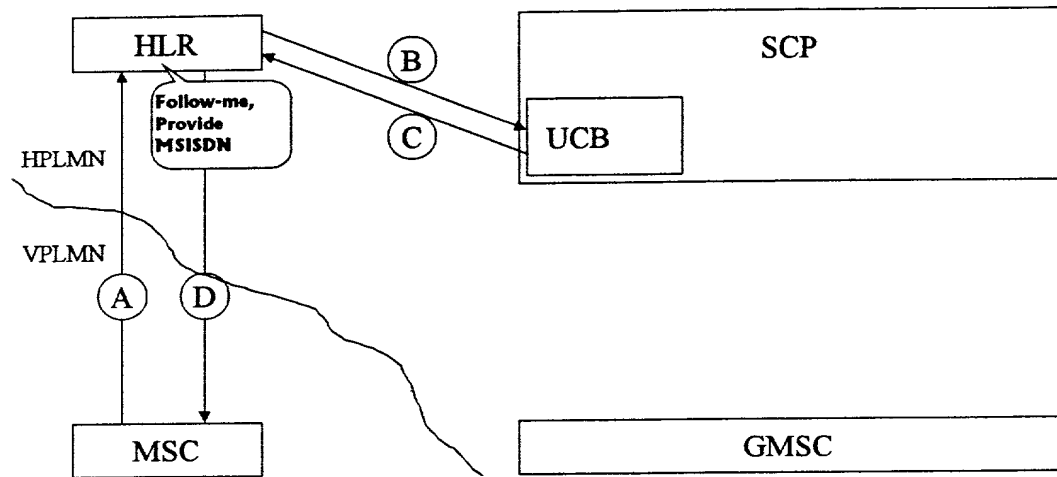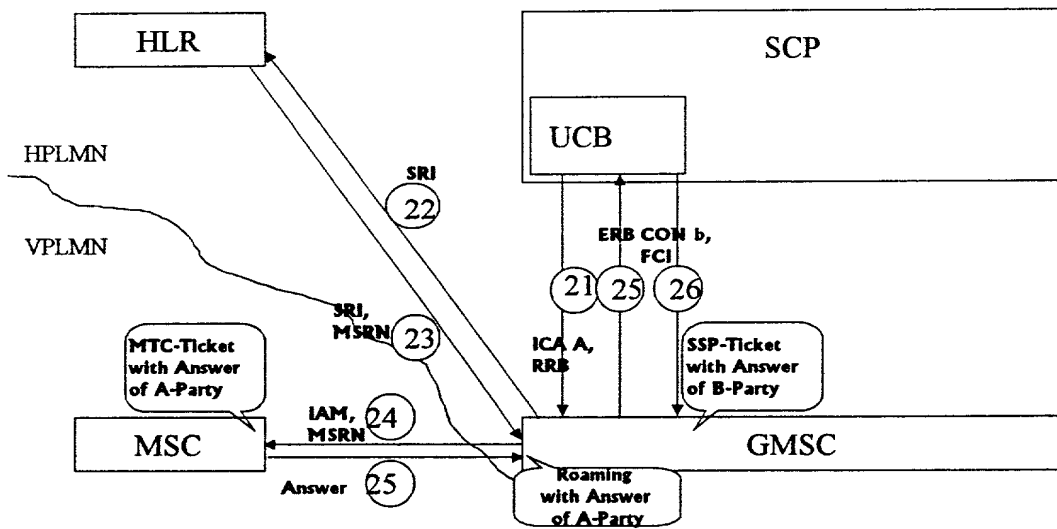30   Attorneys for Applicants

09/831440
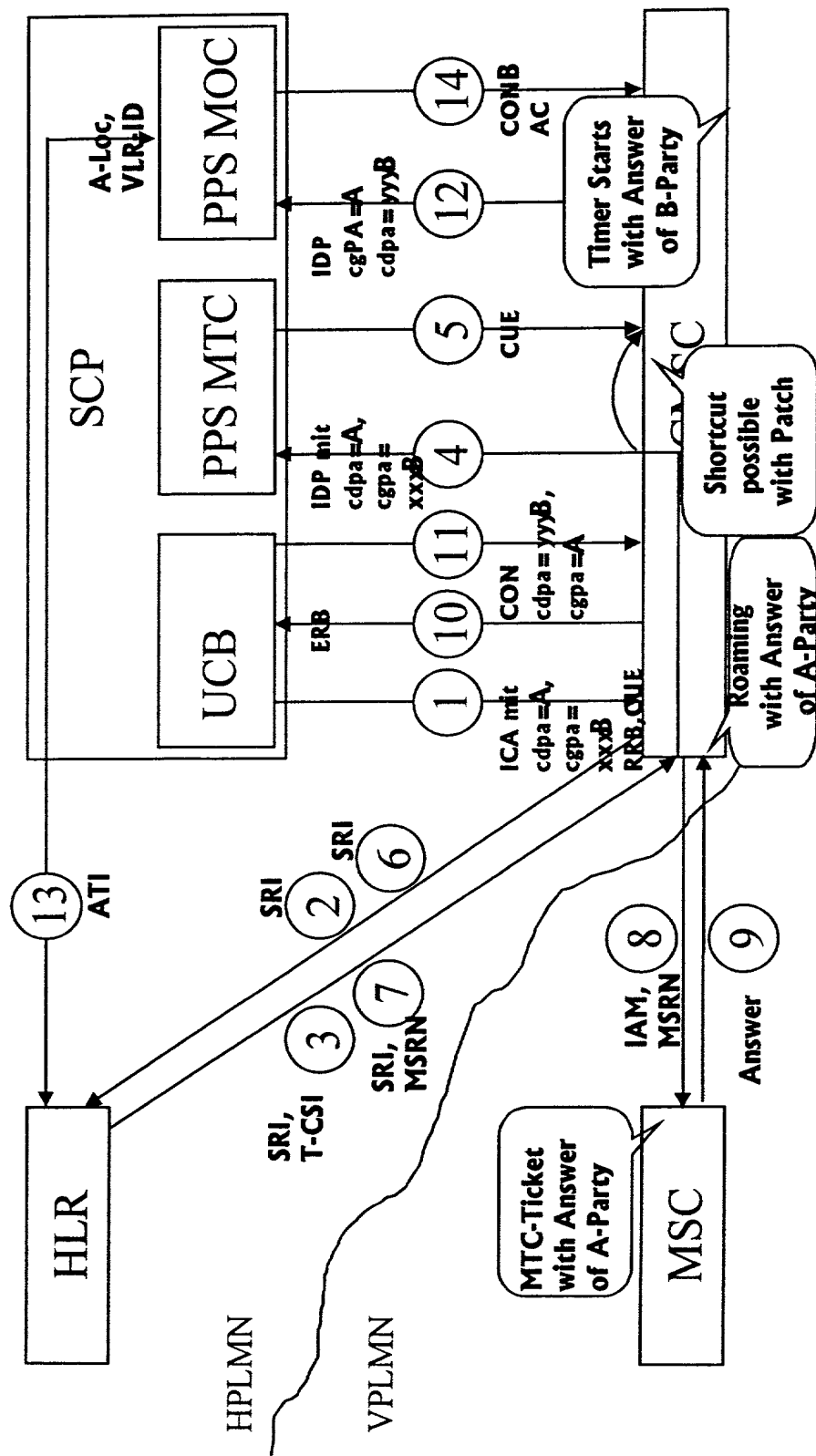

Fig. 1

Fig. 2

2/2

Fig. 3

Declaration and Power of Attorney For Patent Application
Erklärung Für Patentanmeldungen Mit Vollmacht
German Language Declaration

Als nachstehend benannter Erfinder erkläre ich hiermit an Eides Statt:

As a below named inventor, I hereby declare that:

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My residence, post office address and citizenship are as stated below next to my name,

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I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

Verfahren zur Realisierung eines Rückruf-Dienstes in einem Mobilfunknetz

_____

_____

deren Beschreibung

the specification of which

(zutreffendes ankreuzen)

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[X] hier beigefügt ist.

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PCT international application
PCT Application No. _____
and was amended on _____
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I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims as amended by any amendment referred to above.

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I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, §1.56(a).

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Prior foreign appplications
Priorität beansprucht

<u>Priority Claimed</u>

<u>199 43 173.6</u>   <u>Germany</u>   <u>09. September 1999</u>   ☒   ☐
(Number)   (Country)   (Day Month Year Filed)   Yes   No
(Nummer)   (Land)   (Tag Monat Jahr eingereicht)   Ja   Nein

                                                              ☐   ☐
(Number)   (Country)   (Day Month Year Filed)   Yes   No
(Nummer)   (Land)   (Tag Monat Jahr eingereicht)   Ja   Nein

                                                              ☐   ☐
(Number)   (Country)   (Day Month Year Filed)   Yes   No
(Nummer)   (Land)   (Tag Monat Jahr eingereicht)   Ja   Nein

Ich beanspruche hiermit gemäss Absatz 35 der Zivil-prozessordnung der Vereinigten Staaten, Paragraph 120, den Vorzug aller unten aufgeführten Anmeldungen und falls der Gegenstand aus jedem Anspruch dieser Anmeldung nicht in einer früheren amerikanischen Patentanmeldung laut dem ersten Paragraphen des Absatzes 35 der Zivilprozeßordnung der Vereinigten Staaten, Paragraph 122 offenbart ist, erkenne ich gemäss Absatz 37, Bundesgesetzbuch, Paragraph 1.56(a) meine Pflicht zur Offenbarung von Informationen an, die zwischen dem Anmeldedatum der früheren Anmeldung und dem nationalen oder PCT internationalen Anmeldedatum dieser Anmeldung bekannt geworden sind.

I hereby claim the benefit under Title 35. United States Code. §120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, §122, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, §1.56(a) which occured between the filing date of the prior application and the national or PCT international filing date of this application.

(Application Serial No.)   (Filing Date)   (Status)   (Status)
(Anmeldeseriennummer)   (Anmeldedatum)   (patentiert, anhängig,   (patented, pending,
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(Application Serial No.)   (Filing Date)   (Status)   (Status)
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POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith. *(list name and registration number)*

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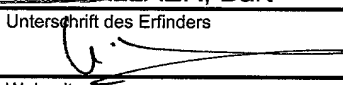**Bell, Boyd & Lloyd**
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